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# Quality management implementation in Russian automotive industry case: PKC Group Russian unit “AEK”

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Quality management implementation in Russian  
automotive industry  
Case: PKC Group Russian unit “AEK”

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This thesis discusses about TQM, automotive industry and quality standards.

The objective of the study is to define the problems existing within TQM system in Russian automotive industry and to analyze the ways to overcome these problems. A Finnish-Russian factory "AEK", which produces wiring harnesses for trucks, is used as a case company.

The chosen research method is qualitative. The data is collected through interviews with quality managers of the case company. The theoretical section is based on the literature concerning the TQM and scientific articles about TQM in Russia. The conclusions are based on the analysis of theoretical and empirical sections of the research.

The findings of this research show that there are certain difficulties in implementing TQM system in Russian factories. Specific factors such as cultural and economical development affect on quality management system. But despite of this, the possibility of successful TQM implementation in Russian factories is relatively high.

Key words: TQM, automotive industry, Russia

## 1 Introduction

### 1.1 Background of the study

People define quality in many ways. Some think of quality as superiority or excellence, other view it as a lack of manufacturing or service defects, still others think of quality as related to product features or price. Today most managers agree that the main reason to pursue quality is to satisfy customers. (Evans James R, 2000, 6-9)

The tendency of enterprises to enter global markets requires continuous work on developing product quality. Total Quality (TQ) is a people-focused management system that aims at continual increase in customer satisfaction at continually lower real cost. There probably are as many different approaches to TQ as there are businesses. (Evans James R, 2000, 13)

Product quality is of great importance for the modern enterprise. To ensure that the quality of product meets or, preferably, exceeds customer requirements, there must be well-constructed quality management system on the enterprise. It not only provides a product of good quality as a final result, but also organizes the production process, making it more cost-saving and precise at every stage. And while most of successful manufacturers have implemented quality management system on their production plants, the same does not yet fully apply to Russian manufacturers.

In order to build the quality management system in Russian factories, many features should be taken into account. It becomes essential especially nowadays, when the world is globalized and many foreign manufacturers set up their production in Russia. The quality of product must meet not only local demands, but also the international standards.

In this study a Finnish-Russian factory “AEK” is used as a case company. “AEK” is located in Russia and it is a subsidiary of the Finnish concern PKC Group Oyj. Concern PKC Group is a manufacturer and supplier of electrical products and systems. The company develops and manufactures electrical wiring for the automotive and electronics industries. PKC Group’s head office is located in Kempele, Finland. The company has production units in Russia, Estonia, China, Poland, USA and Brazil.

All products of PKC Group meet international quality requirements. In order to achieve a high level of quality, an effective quality management system is needed. “AEK” is one of PKC Group units, which have successfully implemented a quality system conforming to ISO standards. The company completely focused on western markets and the entire production of the plant is exported.

The company's success is based on three components: price, accurate delivery and quality, and the second two are the dominant components, i.e. the highest quality products, which are not inferior to world standards, delivered just-in-time specified by the customer. Product quality is inextricably linked to the quality of processes and cannot exist apart from the quality system, which is the guarantor of the success of the company on quality and continuous improvement.

This study emphasizes on the process of developing quality management system on the Russian factory, "AEK" in particular. It investigates the way how the level of the quality in Russian production unit has been increased to such an extent that meets ISO standards.

Automotive industry has a meaningful influence on economical, social, ecological and scientific solutions in any industrialized country. Russia is not exception as well. Nowadays quality improvement possibility in Russian automotive industry isn't fully carried out yet. On the basis of case company this study identifies the main difficulties which may appear during the quality management systems implementation and the ways to overcome them.

## 1.2 Research questions

This paper discusses about automotive industry, Total Quality Management and problems in quality management in Russian automotive industry. The main research questions are:

1. What problems exist within Total Quality Management system in the Russian automotive industry?
2. How can these problems be overcome? Which methods and approaches are useful?
3. How does it affect profitability and competitiveness of the enterprise?

The purpose of this paper is to analyze the problems and difficulties arising during the construction of the Quality Management Systems in Russian factory. The research problem is to study how to overcome these difficulties. The main purpose of this study is to analyze the ability of the system of quality in the automotive industry, built on the basis of ISO9001 series standards, ISO 14001 and ISO / TS 16949 to increase the competitiveness of enterprises, increase sales and profits.

A questionnaire was compiled to ascertain the key issues in building a quality management system and their solutions. All of the data is collected from reliable sources and the interviews were done in AEK Quality management department.

## 1.3 Research process

### 1.3.1 Research process

This work is based on a study of a large number of diverse information on the subject. There were many sources, such as special literature, reliable internet pages and magazines. The discussion with former Vice General Director of “AEK” Mr. Konstantin Klimov was also useful and gave a lot of information for analysis. The primary data for this research was collected by interviews. Interviews were conducted with several factory workers. The interviews were carried out in September 2010.

### 1.3.2 Structure of the study

The first chapter of this paper gives an introduction to the subject of the study and brief overview of situation in general; background of the study, objective of the study, and structure.

The second chapter gives a description of the company as an example of which was made this study. It begins by telling about PKC Group in general, company's strategy and mission. Then it focuses on the Russian unit of PKC Group (“AEK”).

The third chapter handles theoretical part concerning the Total Quality Management, describing what is total quality management, its principles and historical development, and how it is applied in automotive industry.

The fourth chapter is introducing the Quality standards in automotive industry, and it consists of three parts: World quality standards in automotive industry, which describes what kind of quality standard are used nowadays; General principles of quality standards; and finally quality standards in Russian automotive industry and in particular in “AEK” factory, its quality management system and problems in Quality Management Systems construction.

The fifth chapter describes some of the methods used in Quality management and which are used by the case company.

The sixth chapter forms the methodology of data analysis for the research.

Seventh chapter indicates the framework of case study.

Eighth chapter discusses findings of the empirical study.

And finally, 9<sup>th</sup> chapter is conclusion based on findings of the empirical study and interviews. In the end there are references and appendices.

## 2 PKC Group



## 2.1 PKC Group in general

According to the information on the company's webpage, PKC Group is a global provider of design and contract manufacturing services for wiring harnesses, cables and electronics. Company's products and services are delivered mainly to the automotive, telecommunications and electronics industries.

PKC Group has two business areas: Wiring Harnesses and Electronics. Their service concept comprises cost-effective contract manufacture and expert product development and design services. Company's service concept is global sourcing organization and efficient logistics chain supplement.



Figure 1 PKC Group units

The Group has production facilities in Finland, Russia, Estonia, Brazil, China, Mexico, and Poland, employing about 4,100 people in total (Figure 1). PKC Group Oyj's net sales amounted to EUR 201.8 million in 2009. PKC Group Oyj is listed on NASDAQ OMX Helsinki Ltd. ([www.pkcgroup.com](http://www.pkcgroup.com))

### 2.1.1 PKC Group values and strategy

Relying on the company webpage information, it is clear that PKC Group's values support implementation of the strategy and guide their daily operations. There are four key elements which company highlights as components of its values.

First one is commitment. PKC Group commits to the promises it makes to customers, partners

and co-workers.

Second is quality. PKC Group acknowledges its responsibility for the quality of its services and products and aspires to jointly making its operations more efficient and flawless. The company takes responsibility for its operating environment and strives to minimize any harm caused to the environment.

Third value is profitability. PKC Group runs profitable and productive operations, uses capital efficiently, and maintains the solvency of company at a high level.

Fourth one is co-operation. The company's openness, appreciation of each other and equal treatment create the foundation for fruitful co-operation.

PKC's objective is to grow profitably. It seeks growth by deepening existing customer relationships and expanding its operations both geographically and by moving into new customer segments.

In all its operations, the company strives for high customer satisfaction by providing high-quality, competitive products and services, whilst exceeding customer expectations. Close customer collaboration will enable an effective supply chain and the provision of services generating additional value.

To meet its customers' expectations in the future both locally and globally, PKC Group will use cost reduction and operational development programmes to render its operations, production methods and services even more efficient. Furthermore, to ensure its competitiveness, company will optimize production and materials purchases, and relocate production to lower-cost countries.

By developing all of its functions and their mutual co-operation, PKC Group will create a sustainable basis for profitable business operations. The company will also ensure the success and realization of the Group strategy through its competent personnel, who are familiar with the operational environment and understand the customers' requirements.

([www.pkcgroup.com](http://www.pkcgroup.com))

### 2.1.2 Quality management supports business functions

In accordance with company's description on the webpage, quality is one of the Group's values. High customer satisfaction is the result of high-quality daily operations. PKC Group's operations are based on ISO 9001 and ISO 14001 quality and environmental standards and the automotive industry's ISO/TS 16949 quality standard. In company's business, it anticipates changes in the business environment and the increasing requirements of its customers. PKC Group actively conduct internal audits, and it makes use of best quality practices within the Group. Feedback obtained from internal audits and customers is utilized in developing operations. Professionally skilled personnel form an important part of company's quality-capability. Best quality practices also include Six Sigma, which is used in the Wiring Harness business in

the implementation of strategically important development projects. During the period under review, the Electronics business embarked upon a best quality practices project as part of its own operation.

Best quality practices are part of PKC's strategy. The selected practices are tried and tested quality tools and procedures that aid the development and standardization of production processes, methods and products, ensuring that they are as uniform as possible, regardless of production site. Best quality practices are a way to encourage every employee to be closely involved in quality work and to improve quality continuously. Progress will be closely monitored at the Executive Board and as part of external system audits. (PKC Group Annual Report 2009)

## 2.2 PKC Group unit in Russia ("AEK")

In addition to its units in other countries, PKC Group set up its production unit in Kostomuksha, Russia. It was formed in 2003 under the name AEK. The investments made into this factory have been the largest in PKC Group's history. ([www.pkcgroup.com](http://www.pkcgroup.com))

LLC "AEK" (hereafter AEK) is a supplier of automotive electrical systems and electronic circuit boards for the world's leading manufacturers such as Volvo, Renault, Scania and others. The company completely focused on western markets and the entire production of the plant is exported.

The place to build the plant was not chosen by accident - Kostomuksha is located near the Finnish border, and situation significantly reduces costs related to logistics, but also enables the Finnish parent company to exercise better control over production.

The AEK employs about 700 people. There are seven departments: the department of quality management, production department, technical department, logistics department, human resource department, IT and bookkeeping department. Specifically production consists of five departments: cutting and packing of wiring harnesses, the assembly of motor harness for Volvo, department of "3P" generating wiring for Volvo cabs, department producing the wiring harnesses for Scania, and the commercial vehicle department.

The process of wiring harnesses production is as follows: AEK receives raw materials for production from Finnish or Estonian PKC group units; then it produces wiring harnesses and cables, and when the batch of product is completed, it is sent back to Finland or Estonia. The quality management system in the factory is designed so that at each stage of the production quality of the product being tested. The purpose of the AEK is to focus on the customer and

his satisfaction. In order to achieve a high degree of customer satisfaction, each employee must understand the requirements set by the customer and always follow them. Customer requirements are established in the processes of the offer and receipt of orders.

Today the AEK produces tens of thousands of weekly articles which are sent to two hundred items; it has more than ten customers worldwide. The business reached its success due to a number of factors: an advantageous geographical location (proximity to the Finnish border), and cheap energy, and lower than in Europe wages - all these things persuaded foreign firms to place their orders into Kostomuksha, but the basic requirement that they have made to the enterprise is the quality level corresponding to world requirements.

Well built quality control system on the AEK factory is the result of well-considered approach to the situation. Creation of a quality management system started several years ago, when the factory was just built and the products should have been compliant to international standards as soon as possible.

### 3 Theoretical aspects

#### 3.1 Definition

Quality is the degree to which a set of inherent characteristics fulfills a need or expectations that is stated, general implied or obligatory. (Hoyle, D., Quality Management Essentials, 2007, p.10)

The quality gurus W. Edwards Deming, Armand V. Feigenbaum, Kaoru Ishikawa, etc. define it as follows:

"Quality is meeting the needs of customer, both present and future." W. Edwards Deming

"Quality is best for the customer use and selling price" Armand V. Feigenbaum

"Quality is not only the quality of the product, but also of after sales service, quality of management, the company itself and the human being" Kaoru Ishikawa

"Quality is fitness for use and or purpose" Joseph. M Juran

(Beckford 72, 86, 94, 107)

Total Quality (TQ) is a people-focused management system that aims at continual increase in customer satisfaction at continually lower real cost. TQ is a total system approach (not a separate area or program) and an integral part of high-level strategy; it works horizontally across functions and departments, involves all employees, top to bottom, and extends backward and forward to include the supply chain and the customer chain. TQ stresses learning, and adaptation to continual change as keys to organizational success.

The foundation of total quality is philosophical: the scientific method. TQ includes systems, methods, and tools. The systems permit change; the philosophy stays the same. TQ is anchored in values that stress the dignity of the individual and the power of community action. (Evans 13)

Total Quality Management (onwards TQM) is an approach to improving the competitiveness, effectiveness and flexibility of a whole organization. It is essentially a way of planning, organizing, and understanding each activity, and depends on each individual at each level. For an organization to be truly effective, each part of it must work properly together towards the same goals, recognizing that each person and each activity affects and in turn is affected by others. TQM is also a way of ridding people's lives of wasted effort by bringing everyone into the processes of improvement, so that results are achieved in less time. The methods and techniques used in TQM can be applied throughout any organization. (Oakland 18)

What do all these different definitions of TQM tell us? First of all, and not surprisingly, there is a common thread, running through each of them, namely, the comprehensive nature of the approach. It involves all people at all levels in all functions. It really is total in every sense of the word. There is a danger, however, that in practice too much emphasis might be placed on the quality aspects of the definition or even on the management component of the definition. All three elements are of equal significance. (Pike 26)

TQM means first of all a departure from the traditional opposition of product quality and quantity; it excludes the possibility of reducing the quality of the product characteristics in order to increase its output. If necessary, a sharp increase output of products (which may be dictated by market conditions) is certainly expected to choose any direction and actions, except those which may adversely affect the quality of products.

### 3.2 A brief history

To understand the importance of quality in business today, we need to review some history. After the Second World War, Japan decided to make quality improvement programme as part of rebuilding their economy. Two renowned American statisticians and quality experts, Edward Deming and Joseph Juran, spent several years educating the Japanese on improving quality. They convinced top Japanese managers that quality improvement would open new world markets and was necessary for the survival of their nation.

During the next 20 years, while the Japanese were improving quality at an unprecedented rate, quality levels in the West remained stagnant. Western manufacturers had little need to focus on quality. America had a virtual monopoly in manufacturing, and the postwar economy

was hungry for nearly any kind of consumer good. Top managers focused their efforts on marketing, production quantity, and financial performance.

During the late 1970s and early 1980s, many businesses in the United States lost significant market share to other global competitors, Japan in particular.

Ford Motor Company was among the first to invite Deming to help transform its operations. Within a few years, Ford's earnings were the highest for any company in automotive history. In 1992 the media celebrated the fact that the Ford Taurus outsold the Honda Accord to become the leader in domestic sales.

As quality principles matured in organizations, attention to quality as “something new” has faded. Nevertheless, successful organizations have found that the fundamental principles of total quality are essential to effective management practice and represent a sound approach for achieving business success. (Evans 6-9)

### 3.3 TQM in automotive industry

Effective supply-chain management is critical in the automotive industry. There are thousands of components in a vehicle's systems and subsystems. Upon final assembly, the vehicles produced are shipped into a competitive and high-volume global vehicle market. In many cases, vehicle manufacturers source over 70 % of the vehicles' contents from supply organizations positioned at different tiers in the automotive supply chain. These organizations are asked not only to manufacture materials and parts, but also to design, develop, validate and introduce new technology.

In today's lean manufacturing environment, huge contingency stocks of inventory have given way to just-in-time logistics and delivery. The lean inventories of parts and materials mean that a supplier's Quality Management System (QMS) capability and related performance is essential. The risks of failure for all the organizations involved, and in particular for vehicle manufacturers, can be great. Monitoring and assessment of suppliers, including their compliance to QMS, is thus an integral part of the automotive supply chain management strategy, where conformity assessment plays a crucial role. (Bransky J 2008, 17)

Total quality management constitutes a waiver of opposition to the quality and efficiency as two mutually exclusive concepts. Customary market strategy of Western firms included a selection of high quality, or its low price. As a result, when entering the market with a new product the company is usually focused on the price level and the design of laying the new design - technological parameters, not exceeding the cost of production costs.

The approach of Japanese firms in this problem somewhat different: first of all create a competitive product design which meets all outstripping quality requirements. Then, releasing the product on the market, Japanese firms are beginning to rapidly reduce the costs of production, continuously improving technology and organization, introducing new equipment, etc. Lower prices for a product with original high quality can increase sales and increase its market share. This, in turn, makes it possible to further reduce costs through economies of scale.

Essential component in the concept of total quality management is customer orientation. In a market economy, successful business is entirely determined by the correctness of the understanding of market needs, so that any organization needs to fulfill customer needs and strives to exceed their expectations.

Organization that uses the concept of TQM, should systematically collect and analyze information from various sources and can provide valid conclusions about current and potential needs of individual customers and market segments and the overall market. A necessary condition for Total Quality Management is to disseminate information throughout the organization.

#### 4 Quality standards in automotive industry

As quality became a major focus of businesses throughout the world, various organizations developed standards and guidelines. Terms such as quality management, quality control, quality system, and quality assurance acquired different, and sometimes conflicting, meanings from country to country, within a country, and even within an industry. As the European community moved toward the European free trade agreement, which went into effect at the end of 1992, quality management became a key strategic objective. To standardize quality requirements for European countries within the common market and those wishing to do business with those countries, a specialized agency for standardization, the International Organization for Standardization, was founded in 1946. (Evans, 60)

##### 4.1 ISO quality standards in automotive industry

With reference to organization's information on its webpage, ISO (International Organization for Standardization) is the world's largest developer and publisher of International Standards. ISO is a network of the national standards institutes of 163 countries, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISO is a non-governmental organization that forms a bridge between the public and private sectors. On the one hand, many of its member institutes are part of the governmental structure of their countries, or are mandated by their government. On the other hand, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations.

Therefore, ISO enables a consensus to be reached on solutions that meet both the requirements of business and the broader needs of society. (<http://www.iso.org/iso/about.htm>)

The International Organization for Standardization (ISO) Standard 9000 Series (1994) sets out the methods by which a management system, incorporating all the activities associated with quality, can be implemented in an organization to ensure that all the specified performance requirements and needs of the customer are fully met. (Oakland 96)

The level of acceptance in the global business community to the ISO 9000 standards since its original release has no comparison. Certification to these international standards has become an obligatory requirement to the automotive and truck industry suppliers of original equipment manufacturers (OEM assembly plants). It is the baseline to quality management systems (QMSs) not just in the USA, but also all around the world. The unique aspect of companies with green technologies that had their foundation in research and development (R&D) requires a different approach to the implementation of quality systems and therefore a different plan to implement and certify its quality system. (Hector Hernandez, 454-466)

#### 4.1.1 ISO 9000

In concordance with information given on ISO webpage, The ISO 9000 family of standards represents an international consensus on good quality management practices. It consists of standards and guidelines relating to quality management systems and related supporting standards.

ISO 9001:2008 is the standard that provides a set of standardized requirements for a quality management system, regardless of what the user organization does, its size, or whether it is in the private, or public sector. It is the only standard in the family against which organizations can be certified - although certification is not a compulsory requirement of the standard.

The other standards in the family cover specific aspects such as fundamentals and vocabulary, performance improvements, documentation, training, and financial and economic aspects. There are eight quality management principles in ISO 9000:2005:



Principle 1: Customer focus

Principle 2: Leadership

Principle 3: Involvement of people

Principle 4: Process approach

Principle 5: System approach to management

Principle 6: Continual improvement

Principle 7: Factual approach to decision making

Principle 8: Mutually beneficial supplier relationships

([http://www.iso.org/iso/iso\\_catalogue/management\\_and\\_leadership\\_standards/quality\\_management/qmp.htm](http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/quality_management/qmp.htm))

Although ISO 9000 was introduced in the late 1980s, its popularity continues today. It is not surprising then that as at the end of December 2007, there were at least 951,436 ISO 9001:2000 valid certificates issued to companies worldwide (ISO Survey, 2008). The purpose of the ISO 9000 standards is to assist organisations in all sectors and sizes to implement and operate an effective quality management system (onwards QMS).

The Plan - Do - Check - Act (PDCA) cycle is the operating principle of ISO's management system standards. (Figure 1) ([www.iso.org](http://www.iso.org))

Generally, the implementation of ISO 9000 QMS can be divided into five stages: planning (plan), documentation (do), verification and validation (check), deployment (act) and continuous improvement (Nanda, 2005). The continuous improvement stage is actually the phase where maintenance of the quality system ISO 9001 is carried out. (Ab Wahid R,1)

The PDCA cycle was originally developed by Walter Shewhart - the originator of Statistical Quality Control. It was popularized by Edward Deming and is often called the Deming cycle. It gained wide popularity in Japan, through the efforts of Deming.

The PDCA cycle is often depicted as a wheel, as shown in the fig. 1. This is an important concept because a turn of the wheel represents one improvement cycle, which brings us to the beginning of the next cycle. When one cycle is completed, there are two alternatives that can be pursued: control the improved process or go through another improvement cycle.

(Soin 96, 98)

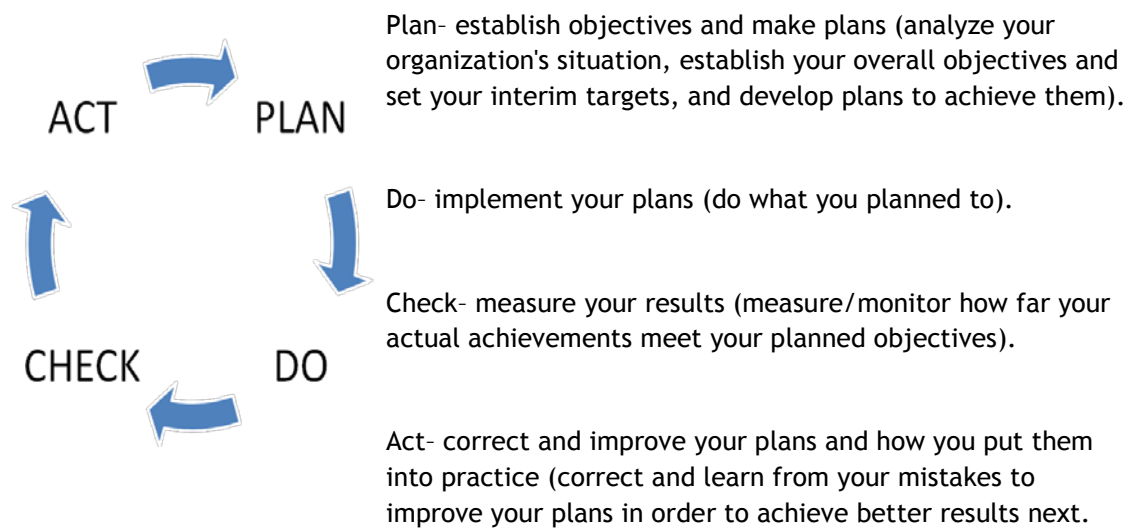


Figure 2 PDCA cycle

([www.iso.org](http://www.iso.org))

#### 4.1.2 ISO/TS 16949

One of the most significant quality standards in automotive industry is ISO/TS 16949:2009. According to ISO organization's information, ISO/TS 16949:2009, in conjunction with ISO 9001:2008, defines the quality management system requirements for the design and development, production and, when relevant, installation and service of automotive-related products.

ISO/TS 16949:2009 is applicable to sites of the organization where customer-specified parts, for production and/or service, are manufactured.

Supporting functions, whether on-site or remote (such as design centers, corporate headquarters and distribution centers), form part of the site audit as they support the site, but cannot obtain stand-alone certification to ISO/TS 16949:2009.

ISO/TS 16949:2009 can be applied throughout the automotive supply chain.

([http://www.iso.org/iso/iso\\_catalogue/catalogue\\_ics/catalogue\\_detail\\_ics.htm?csnumber=52844](http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=52844) )

The volume of certifications and the improvements in product quality and reliability by the certified supply chain confirm the credibility of ISO/TS 16949. In addition, this initiative is contributing to the overall improvement of supply-chain performance. (Bransky 19)

#### 4.1.3 ISO 14000

The third quality standard, ISO 14000 relates to environmental issues.

As it explained on organization's webpage, ISO 14000 family addresses various aspects of environmental management. The intention of ISO 14000 is to provide a framework for a holistic, strategic approach to the organization's environmental policy, plans and actions. It is a management tool enabling an organization of any size or type to:

- identify and control the environmental impact of its activities, products or services, and to
- improve its environmental performance continually, and to
- Implement a systematic approach to setting environmental objectives and targets, to achieving these and to demonstrating that they have been achieved.

([http://www.iso.org/iso/iso\\_catalogue/management\\_and\\_leadership\\_standards/environmental\\_management/iso\\_14000\\_essentials.htm](http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/environmental_management/iso_14000_essentials.htm))

#### 4.2 Applying ISO quality standards in Russian automotive industry

Compared to the rest of the world, quality management in Russia is still in its infancy. Unless an appropriate quality culture is developed to support and sustain quality management practices, it would be ineffective to introduce quality management systems into Russia.

Quality management in Russia was established during the time of Soviet era, where traditional quality control methods were widely adopted as a basic management tenet in managing old-fashioned manufacturing departments. In the 1980s quality systems such as ISO 9000 started to emerge, and were implemented for the first time in a number of Russian companies. During that time, comprehensive sets of technical standards were maintained and institutionalized by the State Committee of the Russian Federation for Standardization and Metrology (Gosstandart, 2002), which was established to develop the standardization of products, services, and any type of works from Russian industries. Despite the spread of quality management techniques that has taken place in Western Europe, quality management and its implementation is just beginning in Russia today. Total quality (TQ) management will play an increasingly important role as companies operating in Russia compete in both the domestic and global markets. (Khoo 1)

Though the standards ISO 9001 and ISO 14001 is sufficiently broad and have long been used abroad, in Russia this process is still at the stage of development, especially for the requirements of environmental protection, based on ISO 14001, although the number of enterprises certified under this systems is growing from year to year.

A very dense work between the supplier and the customer-specific on both sides is required. As the director of quality GM-Avtovaz Peterhanzel P., at the 7th Conference on Quality in Nizhny-Novgorod told: - "When I arrived in Togliatti in June 2001, I began working on the development of strategic planning processes of quality. This plan is based on the requirements of General Motors concerning the organization of the quality system objectives, indicators of quality, working with suppliers, which means its standards and obligations. No one had any experience with Russian suppliers, and so we started with the best practices existing in the corporation General Motors. But very soon we realized that it's not enough just to take the best practices of GM and implement it. Why? There are many reasons.

Understanding of the quality by engineers, designers, workers and even senior management was different from that to which we aspire. And it meant that we had to start with defining what we mean by quality and what we expect from our suppliers.

Vendors should assume more responsibility for the products, even if they are not responsible for the final construction. This is an area where we still have many problems. Sometimes, when we invite the charge supplier of one or another problem, it takes several hours to find the necessary specialist. If one person is on leave, in this case there is no one who could provide the necessary information. This is unacceptable. When the needed expert is found, then it takes the time to talk on the phone, whether this is a real problem. We have to convince this man that we need help, and there is a need to execute better. "

Quite naturally, this does not satisfy customer needs. It must be understood. Moreover, as a rule, the customer himself offers his help and tries to work as closely as possible with suppliers. At the unwillingness of the provider to cooperate, it is difficult to talk about his learning and understanding the requirements, the complexity of work increased sharply, and the performance drops sharply. This situation is still typical for the suppliers of materials and components in Russia, so very small number of domestic companies supply products for joint ventures and branches of foreign corporations. Although the situation is improving from year to year. (Peterhanzel, 31)

The restructuring of the Russian political and economical systems is providing new opportunities as well as risks for doing business in Russia. This will make many business leaders pay more attention to TQ management, which is still new in many Russian companies.

It is generally recognized that the quality of Russian products will have a critical impact on the success of its economy. However, unless an appropriate quality culture can be developed to support and sustain TQ practices, it would be ineffective to start implementing TQ in Russia. (Khoo H.,4)

## 5 TQM methods in automotive industry

In this chapter the descriptions of different quality improvement techniques are given. All of these methods are used in case company, "AEK".

In every significant field of human endeavor, there is continual change and development. Many ideas and approaches to addressing specific issues are considered and tried, but very few withstand the rigors of testing to become established in the mainstream of theory and practice, and become conventional wisdom on the field. Those writers and practitioners whose ideas come to form this body of accepted knowledge, who lead and advise a movement, become known as "gurus". It is notable that although quality systems and approaches continue to develop, no new individuals appear to be emerging in this field. (Beckford, 53-4)

### 5.1 Lean Production

The term "lean manufacturing" or "lean production" were first used by Womack et al. (1990) in their historical book *The Machine That Changed the World*. The lean manufacturing describes the profound revolution that was initiated by the Toyota production system against mass production system. Womack and Jones continued their research in lean production and studied the transfer of other companies into lean crusade in their second book, *Lean Thinking* (Womack, 1996). They explained that lean manufacturing is much more than a technique; it is a way of thinking, and the whole system approach that creates a culture in which everyone in the organization continuously improve operations.

Lean means "manufacturing without waste." Waste is anything other than minimum amount of equipment, materials, parts, and working time that are absolutely essential to production. The lean approach is focused on systematically reducing waste (Muda) in the value stream. The waste concept includes all possible defective work/activities, not only defective products. Waste can be classified in eight categories:

- (1) Motion: movement of people that does not add value.
  - (2) Waiting: idle time created when material, information, people or equipment is not ready.
  - (3) Correction: work that contains defects, errors, rework mistakes or lacks something necessary.
  - (4) Over-processing: effort that adds no value from the customer's viewpoint.
  - (5) Over-production: producing more than the customer needs right now.
  - (6) Transportation: movement of product that does not add value.
  - (7) Inventory: more materials, parts or products on hand than the customer needs.
  - (8) Knowledge: people doing the work are not confident about the best way to perform tasks.
- (Taj 2004 334-335)

### 5.1.1 Kamishibai

As a part of Lean Production philosophy, Kamishibai method is used to reduce the time waste in production process. The so called Kamishibai project was implemented on “AEK” factory. The special boards with daily, weekly, monthly lists of duties were placed into each manager’s working place. These are things that might need to be done on a regular basis (daily,

weekly, or monthly) to ensure that a specific process or system is doing what it is supposed to be doing. As the operation is done, the T-card should be turned over as well.

(Picture 1)

T- cards are designed for production supervisors. Cards are given clear visualized picture of daily/weekly/monthly responsibilities:

- easy controlling tool for supervisors and managers
- Visualization
- Conform processes are going right
- Standardization of the working methods within the whole company



Picture 1 Kamishibai T-card board

### 5.2 Six-Sigma

Six-sigma is a process for improving processes. Sigma is the measure of a process’s capability to perform defect-free work. The company’s approach to process improvement is based on six steps of Six-Sigma:

1. Identify the product you create or the service you provide. What do you do?
2. Identify the customers for your product or service, and determine what they consider important. For whom do you do your work?
3. Identify your needs to provide a product/service that will satisfy the customer. What do you need to do your work?
4. Define the process for doing the work. How do you do your work or process?
5. Make the process mistake-proof, and eliminate wasted effort. How can you do your work better?

6. Ensure continuous improvement by measuring, analyzing, and controlling the improved process. How perfectly are you doing your customer-focused work?

The purpose of this process is to help employees define, measure, control, and improve their processes. (George, 151)

### 5.3 FMEA

It is possible to analyze products, services, and processes to determine possible modes of failure and their effects on the performance of the product or operation of the process or service system. Failure mode and effect analysis (FMEA) is the study of potential failures to determine their effects. (Oakland J. 209)

This technique has long been used in design for manufacture as a means of preventing potential problems in new designs. It can also be used as a diagnostic tool. A new product design is studied and its various failure modes identified. A failure mode is defined as the circumstances under which something might go wrong. This involves asking the question what might go wrong? All potential problems are identified and rated as to probability and seriousness and an index created. (Pike, 253)

## 6 Research methodology

At this chapter, the methodology used in the research, is explained. It also states the reasons, why the specific methodology was chosen and goes through the research procedures which were implemented.

### 6.1 Justification of the method

Case studies are used to study particular phenomena in particular settings. The case study method is very common in business research and is particularly useful for the analysis of organizations. (Adams J., Khan T.A. H., 2007, p.112)

Qualitative research method combined with a case study method was chosen in the beginning of the research, the reasons for the choice are mentioned above.

Case studies are to do with uniqueness, understanding and particularisation rather than generalisation. They are naturalistic and field oriented. They ask questions "How?" and "Why?".

A case study is an in-depth study which explores issues, present and past, as they affect one or more units (organisation, group, department or person). Case studies are often used by

those researching operations management who are attempting to identify the “best practice”. This “best practice” might be in implementation of Total Quality Management. (Adams J., Khan T.A. H., 2007, p.112)

The fact that case study method is especially useful in relation to Total Quality Management research papers is also proved by the Alan Simon, Amrik Sohal and Alan Brown in their article “Generative and case study research in quality management”. According to the article, benefits of case study method are:

One of the most rewarding aspects of case study research is that it enables the researcher to get the “feel” of what people really think about TQM and what it has done for them personally.

Case study work helps bridge the gap between academia and industry. Each side has the opportunity to learn something from the other. As the number of cases expands, organizations tend to be willing to participate as hosts since they see that they can gain access to a researcher with a wealth of knowledge about TQM for no charge. (Simon A, Sohal A, Brown A, 1996, 38-39)

The decision to focus on one company was founded on the following reasons: first, the concept of quality management may be interpreted differently in each company since the conditions in Russian organizations are very different. For instance, the case company AEK is situated close to the Finnish border and owned by a Finnish company, therefore, it affects much on the Russian unit quality development.

Since a case-study method is used as a basis, a qualitative method of research and therefore an interview with appropriate persons from the company was found to be the most suitable and useful way to collect the primary data to complete the research. The correspondence was personal face-to-face interview, it was recorded and translated. The atmosphere was calm and interviewees had the opportunity to think about their answers.

By the term “qualitative research”, we mean any type of research that produces findings not arrived at by statistical procedures or other means of quantification. It can refer to research about organizational functioning, social movements, cultural phenomena.

Qualitative research does not entail making statements about relationships between a dependent variable and an independent variable, as is common in quantitative studies, because its purpose is not to test hypotheses. The research question in a qualitative study is a statement that identifies the phenomenon to be studied. It tells the readers what the researcher specifically wants to know about this subject. (Strauss A, Corbin J, 1996, p 10, p41)



Alan Simon, Amrik Sohal and Alan Brown in their article define advantages of qualitative research vs. quantitative research in TQM cases:

The findings of case study research tend to be widely accepted by industry. This may be related to individual curiosity about what others have done. Also, the style of writing is often more readable than is the case with much quantitative research.

The use of interviews allows the researcher to gain rich insights to issues which are normally not amenable to questionnaires. Unstructured interviews or parts of interviews enable people to tell “real” stories, and observation, particularly of team meetings and presentations, permits the researcher to see, analyze and interpret real activities.

Personal contact enables long-term relationships to be maintained, permitting longitudinal material on organizations to be documented and observation of the development of quality management over a period of time. (Simon A, Sohal A, Brown A, 1996, p.38-39)

Secondary data for this research was collected from books, articles, magazines, annual reports, company website and brochures, reliable internet sources. They provided useful information concerning total quality management, quality standards, and other information related to this study.

## 6.2 Research Procedures

In the beginning of this study other researches concerning Total Quality Management were investigated. For example, particularly *Quality management implementation in Russia*, the research carried out by Dickenson R.P., Campbell D.R., Azarov V.N. It was found very useful and interesting and applicable to this case. Another noteworthy research which was studied is *Critical success factors for quality management implementation in Russia*, carried out by Khoo H., Tan K.

The main questions of study and interview were formulated based on review of these papers. They created a picture of Total Quality Management implementation situation in Russia as a whole, and hence it became possible to think about particular questions as well as about how this situation is related to this case. During the developing the structure of an interview, about 10 questions were formed. However, since it was an in-depth research interview with semi-structured approach, some additional questions arised during the interview.

If you follow a more qualitative approach then you may well engage in In-depth Research Interviews. These tend to last around one hour and probe behind the straightforward questions. These interviews yield a vast amount of rich information. Often a semi-structured approach is taken; in this you produce a "road-map" of questions which guides you through the interview. A question is asked and then you respond with more questions to the reply. (Adams J., Khan T.A. H., 2007, p.145)

The interviews were conducted with two appropriate persons. First one, Konstantin Klimov, was working at AEK at 2002-2009 years, first as a Quality Department Manager, then as a Production Manager, and during the last years as a General Director Deputy. The reason for choosing him as a interviewee was that he was managing the quality issues at factory from the beginning, when the factory got its first ISO certificates. In fact, he was responsible for creating the quality management system on AEK, structurizing it and implementing Total Quality Management methods in the production. Despite the fact that Konstantin Klimov is former employee of AEK, the most useful information he provided is related to Quality Management implementation on AEK, when he was a Quality Department Manager. An interview was conducted on 12th September 2010.

Another person which was interviewed is Ksenia Schcukina, she is current Quality Department Manager at AEK. An interview was conducted on 17th September 2010.

Interview questions were designed for each respondent in a little bit different way. Since Konstantin Klimov was responsible for quality management in earlier years, the questions to him are mostly related to the experience of TQM implementation. And for current Quality Manager the questions are concerning current quality issues and procedures. Accordingly, in some way there is a comparative situation, but only in few moments. Mostly these two sources of information are complementing each other and provide a more complete picture of situation.

### 6.3 Reliability and validity

The interviews are the only source of primary information for the case study. Both interviewees provided an active contribution to the study. No any doubtful information was observed. There was an open discussion between interviewer and interviewees. Both interviewees has read the empirical part of the research and found the information interpretation correct and relevant.

## 7 Framework of the study

Figure 4 on the next page shows the framework of the study. It indicates all the issues which should be taken into consideration when implementing TQM system in case company. The framework tries to highlight the most important points concerning the TQM implementation and development in Russian factory, “AEK” in particular.

The framework shows the process of quality development on the factory. The final stage of this process is achievement of quality level which conforms to ISO standards. To get the high quality level, the enterprise should overcome the obstacles which are listed on the figure.

As shown in Figure 4, the obstacles which may appear during the TQM implementation are divided into two groups: internal and external. Both of them should be taken into consideration, if the enterprise is going to avoid the failure.

## 8 Findings of the empirical study

The purpose of the empirical part of study is to find answers to the questions of research, such as which problems arise during the TQM implementation on Russian factory, how to overcome these problems, and how it might help in competitiveness provision.

This section consists of information regarding the obstacles which arise during the TQM implementation, both internally and externally, the ways how to overcome them, and finally, how it will lead to ISO standardization. Additionally it discusses how all these methods help to provide competitive advantage and increase profitability of the enterprise.

### 8.1 Quality management implementation at AEK

As it was shown in theoretical section, there are evident particularities in TQM implementation in Russia.

According to former quality manager of AEK Mr. Konstantin Klimov, there were certain difficulties in quality management implementation in the factory as well. After the interview they were divided into two kinds: internal and external. Internal difficulties are those which appear inside of the enterprise, and are caused by internal factors. External difficulties are those which surround the enterprise in particular area or country with its regulations and economical situation.

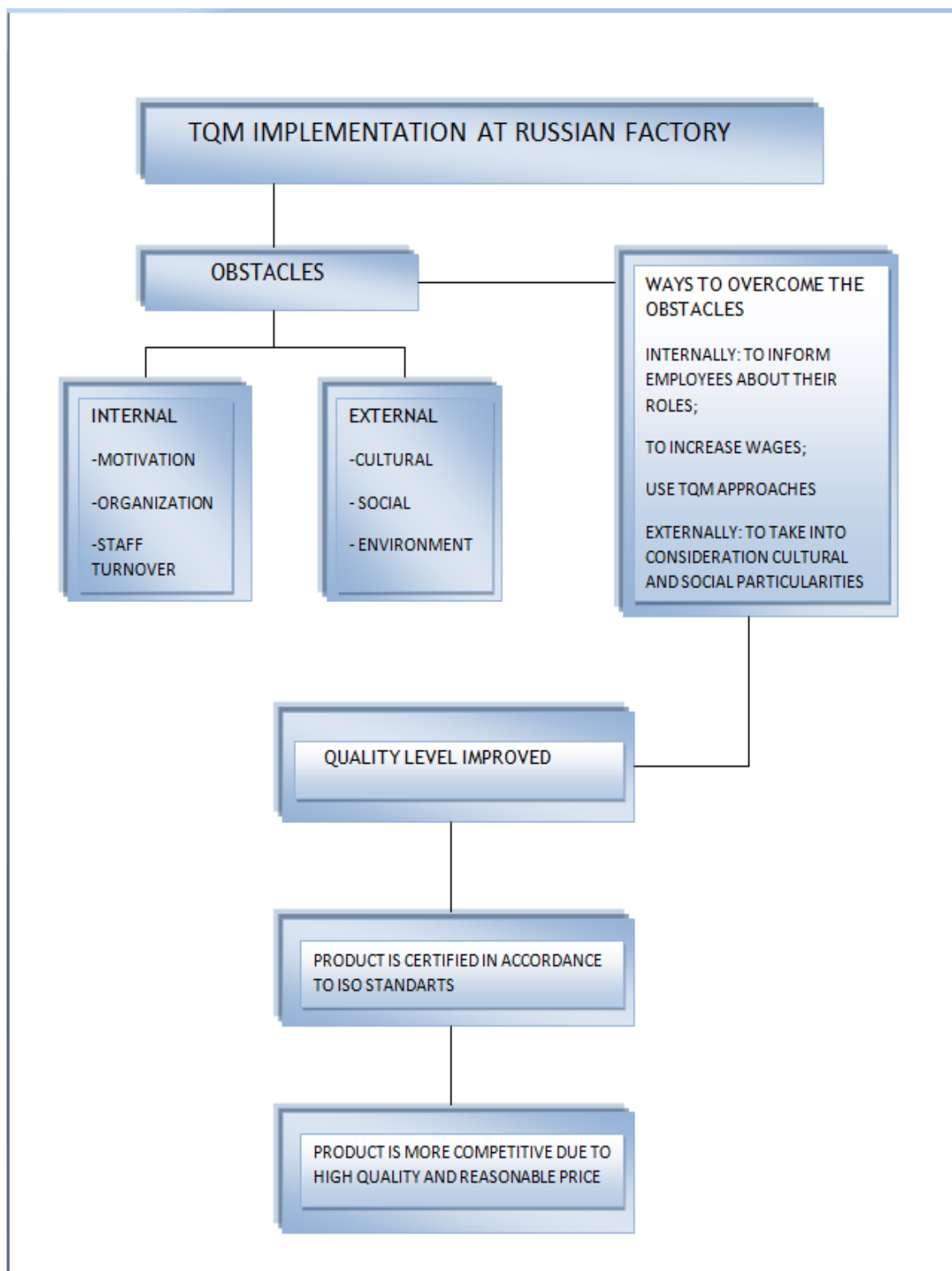


Figure 3 Framework of the study

### 8.1.1. External problems

External problems which appear during TQM implementation in Russian factory can be summarized as cultural, social, and environmental.

#### 8.1.1.1. Cultural particularities - Leadership

In general, the difficulty of overcoming inherited cultural legacies is a theme of writings on quality management in Eastern Europe: in Poland, (Kindlarski, 1996), and in Russia (Pooley and Welsh 1994), where the lack of worker involvement, inherited from the command economy, is seen as a major barrier. (Dickenson, 69)

Studies of Russian managers by various authors (e.g. Bollinger, 1994; Naumov, 1996) have discovered that the Russian management culture is characterized by high power distance, low tolerance to uncertainty, and high appreciation for collectivism. The high power distance culture among the Russian people, combined with high uncertainty avoidance, has resulted in a “pyramid-shaped bureaucratic structure” which is both formal and centralized (Bollinger, 1994). Ardichvili et al. (1998) remarked that a significant percentage of Russian business people displayed autocratic leadership styles, and preferred to make important decisions without consulting their peers or subordinates. They shouldered most of the responsibilities of running their companies, with little or no feedback from their workers (Puffer, 1994). The Russian autocratic leadership style is not supportive of the new quality management philosophy, which advocates encouraging employee participation and feedback for proving quality at all levels, as well as the use of employee empowerment strategies. (Khoo, 264)

#### 8.1.1.2. Social particularities

Russia is a low-trust society. This has its background in the underdevelopment of its social institutions and the uncertainty of institutional development. Vadim Radaev (2004, 93) sums this up as follows. “Formal rules are contradictory and unstable. There is a lack of enforcement, which produces a high level of uncertainty. State legislative policy and regulative policy is not predictable my market actors. As a result one-sided trust in institutions remains low.”. These institutional deficiencies are also reflected in the scarcity of reciprocal trust in business-to-business relationships. Honesty often does not pay. (Blom, 211)

#### 8.1.1.3. Environmental particularities - resources and technology

Many Russian companies lack capital to purchase sophisticated equipment such as robots, flexible manufacturing system, and computers (Radovitsky, 1994, Puffer, 1994). This is added to the fact that many current manufacturing systems were inherited from the Soviet period and are mostly outdated and operated based on tight rigid production schedules with little room for flexibility. (Khoo, 265)

#### 8.1.2. Internal problems

Internal problems are identified according to the interviews materials and articles. Mainly they are related to motivation and organizational issues.

##### 8.1.2.1. Personnel motivation

The Russian labor market has been inefficient and many companies operating in the country are faced with big challenges in recruiting skilled employees. Radovitsky (1994, p 49) reported that: "For over 70 years the Soviet system created a type of worker with a low level of interest in the quality of productive work, with no real participation in organization improvement, and psychologically indifferent to all innovations." In the traditional Russian work culture, freely expressing opinions and suggestions was viewed as being too outspoken and is considered inappropriate. (Michailova, 2000). This has hindered employee participation and feedback. (Khoo, 264)

##### 8.1.2.2. Organizational structure

Several researchers have noted that one of the problems with the Soviet economy was that it placed too much emphasis on production schedules and too little on product quality. The priority that an organization places on quality has a direct impact on quality performance. Companies that accord quality as a top priority would tend to produce higher quality products. (Khoo, 264)

##### 8.1.2.3. Staff turnover

According to interviews materials, there are also difficulties in TQM implementing on the factory due to the staff turnover. If employees become rather familiar with quality management system, but simply don't stay for a long time, it becomes a waste of resources: both financial and human. It takes time when the new employee gets familiarized with quality management systems. As a result, product quality suffers because of lack of skilled personnel.

#### 8.2. The ways to overcome the difficulties

As the difficulties which may arise during TQM implementation were divided into external and internal, the ways to overcome them are separated accordingly.

#### 8.2.1. The ways to overcome external difficulties

Understanding an organization's approach to quality management requires a degree of cultural analysis, and cultural factors have been recognized as important in the management learning process in Central and Eastern Europe. Evolutionary gradualism, striving for maximum cultural harmonization, is consistent with much current thinking on successful management learning strategies in the region (Vlachoutsicos and Lawrence, 1996). In particular, sensitivity to language and cultural issues, and the need to build on and complement local management values have been seen to be crucial for success. Russian management researchers also recognize the importance of culture and psychology. Management perceptions of the influence of Russian and Japanese national culture on organizational behavior (Zankovsky, 1996), and the need to include cultural issues in management training syllabuses, (Grachev, 1995) have been studied. (Dickenson, 69)

#### 8.2.2. The ways to overcome internal difficulties

For the case of Russia, planning for quality must be performed taking into account the following factors:

- Preparing the workforce to face changes and new challenges
- Shifting emphasis from traditional modes of quality control and conformance to TQ implementation at every level of an organization
- Creating a strong focus on customer-driven goals
- Involving all departments and employees to contribute to and improve quality.
- Introducing flexibility and innovation

Senior managers furthermore need to communicate the organization's vision and goals to everyone, as well as stress the importance of taking action in implementing and maintaining the quality management system. (Khoo, 265)

In order to familiarize personnel with quality management system, different trainings are arranged at AEK. After the training ends all of the staff held an examination. Mostly the trainings are related to Lean Production and other TQM techniques.

In order to reduce staff turnover, the salaries were increased. It was the reason for employees not to leave.

As Mr. Klimov noticed in the interview, the rewarding system is also very useful to motivate employees. The fewer defects on the production process the more bonuses employee receives. It affected the quality level largely. (Table 1 and 2)

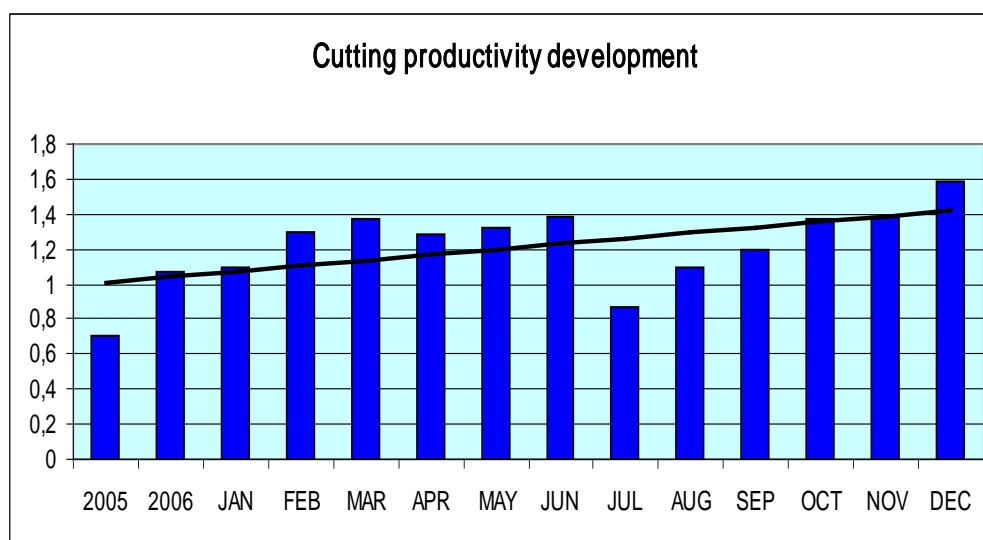


Table 1 Productivity development at AEK 2005-2007 (Cutting department)

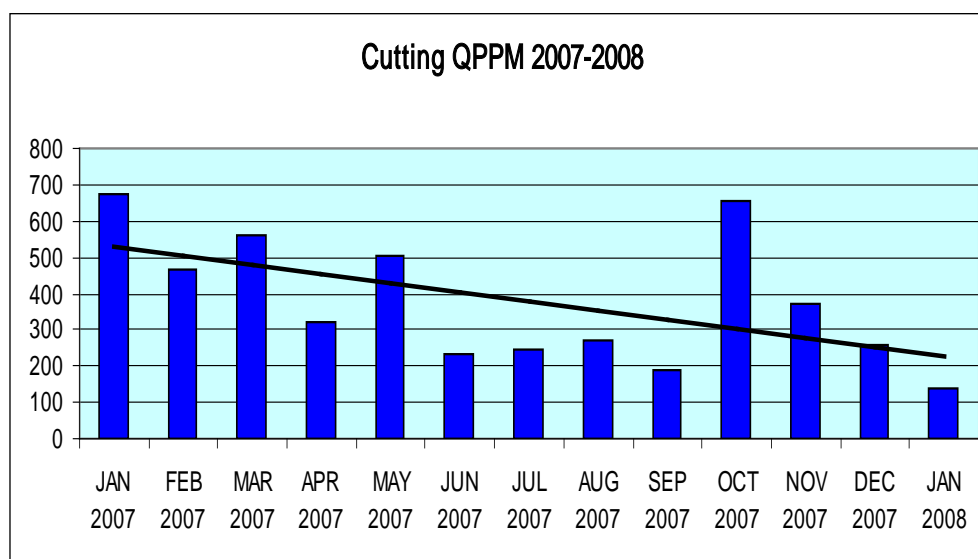


Table 2 QPPM\* Quality development at AEK 2007-2008 (Cutting department)

\*QPPM is Quality Product Per Million, counted as: number of defect product divided on the number of tested product and multiplied on 1000000. Accordingly, the smaller number of PPM, the higher the quality of production.



### 8.2.3. Applying TQM methods at AEK

Most companies waste 70 percent-90 percent of their available resources. Even the best lean manufacturers probably waste 30 percent. Interestingly, every company has to find its own way to implement the lean method: there is no universal way that will apply to all. Despite the wide knowledge and available resources, many companies are struggling to stay “lean.” (Taj, 335)

The enterprise which is going to apply Lean production at production process, should take into consideration all the external and internal factors. Case company AEK had successfully implemented Lean philosophy on its production, but it was adapted to the factory according to external and internal issues. The same applies to Six Sigma method, which is also used at AEK. Both of methods also reduced amount of difficulties occurred during TQM implementation, by organizing employees and production process.

Various studies show that combination of Lean and Six Sigma methods provide even better result. The joint implementation of the programs result in a lean, Six Sigma (LSS) organization, overcoming the limitations of each program when implemented in isolation. (Arnheiter,5)

### 8.3. ISO certification

As the case company AEK operates in international environment and the entire product is exported, all of products are certified in accordance to ISO. In order to certify products, AEK goes through both external and internal audits held by specialists. It is of great importance for the enterprise, taking into consideration the fact that it makes Russian enterprise competitive with foreign ones and increases profitability.

### 8.4. Competitiveness provision

By using TQM methods case company AEK organizes its production process, and may compete with foreign competitors due to the lower price and high quality of the product.

A competitive company must have both high quality goods and provide a high quality of service. For example, a company that operates in a batch-and-queue mode runs the risk of providing poor service to customers even if quality is at six sigma levels. By reducing manufacturing lead times, a company that is producing to order will enhance competitiveness by achieving faster deliveries or by meeting promised due dates a higher proportion of the time. (Arnheiter, 14)

Competitive advantage can be defined as the result of a business being either a particularly able player in its market (i.e. being better, which could mean being lower cost or more lean) and/or, being differentiated in what it offers. (Lewis, 964)

#### 8.5. Profitability increase

The pursuit of quality excellence does not come at the expense of financial excellence. Rather, financial results are another way of measuring the effectiveness of the system. The difference is that the goal is customer satisfaction, with the understanding that profits will improve as quality improves. Delighting customers, reducing waste, and increasing productivity are natural by-products of a systematic process of continuous improvement.

- Products and services that exceed customer requirements are of greater value to customers than competitor's products and services. Increasing numbers of customers are likely to purchase such quality, and that improves market share and grows revenues
  - Less waste and greater productivity result in lower costs, which, in turn, improve margins, asset utilization, and competitive position
  - Higher revenues and more favorable margins, asset utilization, and competitive position improve the bottom line, which delights shareholders.
- (George, 7)

#### 9. Conclusion

As the market reform of the Russian economy domestic companies are beginning to show more and more obvious interest in the issue of quality. This is evidenced by an increase in the number of companies able to compete in domestic and foreign markets, not only by reducing costs, but also by improving the quality of products or services.

The main difficulties with TQM implementation are caused by the dominance of an organizational culture that has developed during the Soviet Era, and the underdeveloped system of regular management based on competitive market conditions. Therefore, the transition to management by the ISO 9000 standard, the principles of TQM and ISO/TS 16949 requires a parallel formation of the main operational policies and business strategy.

The AEK, Russian unit of Finnish company PKC Group, have successfully certified its production according to ISO quality standards. In order to do that, quality management system was implemented on the enterprise. During the TQM implementation process, some difficulties

occurred. In this study they are divided into internal and external. External difficulties are cultural and social particularities of Russian society that have emerged during the Soviet Era. At the same time economic situation is one of the external factors which affect quality development on the enterprises.

Internal difficulties which affect quality implementation are those that are inside the organization. These include motivation of the personnel, leadership, training, staff turnover, and others.

It should be noted that in AEK factory case internal factors have greater impact on TQM implementation than external. Despite the fact that social and economic conditions are undoubtedly important, in this case organizational and personnel issues were the main obstacles in TQM implementation. One of them is motivation of the personnel. One of TQM concepts is involvement of all the employees in quality improvement, on each stage of production. As is evident from the interview, first time some of employees did not understand the importance of TQM implementation. In order to improve the situation, quality managers should always communicate to all the employees the quality strategy. Additionally, in case company in order to motivate personnel the incentive system of salary was introduced, this greatly improved the situation.

The trainings were organized on the factory and different TQM methods introduced. It helped to organize the production and save resources, for example, using Lean production methods. As a result, quality level increased, as is evident on the table in Appendices 2 and 3. The quality became better, but production costs reduced, which resulted on the final price of the product.

Eventually, when the product quality level became relatively high, it was certified according to ISO standards. This allowed the company to promote the product in the foreign markets as well as to be competitive due to the high quality of the product and lower prices. From the perspective of partners working in foreign countries the availability of a quality management system certified by a recognized international standard, is not only a guarantor of the quality of final products, but also significantly reduces the risk of the insurer when entering into transactions. And it allows you to achieve considerable savings on insurance premiums, and makes the offer of the company more competitive.

The situation is changing rapidly also in Russia itself, the availability of quality system certificate becomes vitally important. On the basis of this study it can be argued that the possibility of TQM implementation on Russian factory is relatively high, though there are obstacles to take into consideration, but there are ways to overcome them. The successful TQM implementation

on Russian factory requires a thoughtful approach, and only in this way it will bring real benefit.

#### 10. Suggestion for further research

In this paper, the process of TQM implementation in Russian automotive industry has been studied. It is obvious that TQM systems implementation and ISO certification enhance the production process. But there is still a question remaining concerning the post-certification period. The suggestion for further research is how to avoid the concept of “paper quality” which characterizes the absence of real improvements in product quality in the presence of a certified ISO 9000 quality system.

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## Attachments

## Interview with Konstantin Klimov, former quality manager of "AEK" Factory

## 1. Could You please describe the current situation in Russian automotive industry?

Konstantin: Today the possibility to improve quality in the Russian automotive industry is not fully realized. And the only change in the organization of production and management is indispensable. We have to pay, and pay much, for the long-term neglect of the quality. Quality should be the subject of investment and the most advantageous investment, but these investments will be profitable under one condition, if initially they will go to people, knowledge, competence, the ability of staff and automobile factories of suppliers.

To ensure the competitiveness of the products we must meet customer requirements or needs of customers. These requirements are usually included in the specifications or standards. However, by themselves the technical conditions are not a guarantee to meet customer requirements, as in product design, technology or organizational system covering research, design, manufacture and sale of products (services), there may be inconsistencies. The likelihood that products will be designed to respond to customer requirements, increases if the company has an effective system for ensuring the quality of products or services. This fact led to the inclusion in the contracts system requirements, quality systems which complements the requirements for products or services, as well as verification of the QS in the supplier company. This leads to release and deploy, in addition to the technical specifications the standards for quality systems.

## 2. Which quality standards are used in production processes?

To date, the most common is the quality system which is built on the basis of the requirements outlined in ISO 9001:2008.

The trend in the automotive industry develops in such a way that more and more companies certified according to ISO 9001 did not feel the apparent benefits of implementing the standard, apart from raising their image, trying to find a way out of this situation. They find it in the effort to create a quality system based on international industry standards such as QS - 9000, VDA 6.1, etc., which are also faced with several challenges. But this is the problem of a different level and significance. First, due to the globalization of the world market, the world's leading automotive corporations aspire to the unification of requirements in order to make life easier for both them self and many suppliers, created a single industry standard ISO / TS 16949:2002, based on ISO 9001 and which include sectoral requirements and links to various guides, designed to continually improve the quality of products and processes. Secondly, the requirements ISO/TS16949 are not such a vague requirement that someone somehow understands and somehow performs. This is specific guide to action, based on the implementa-

tion of strict guidelines and regulations. In the west, the transition to this new standard is almost imperceptible, but in Russia this new standard has identified many problems in the Russian automobile industry, and not all producers can resolve it on their own.

### 3. Which problems arise in Russian automotive industry during the implementation of ISO standards? And the reasons for it?

Konstantin: The process of certification of quality systems began and at the end of 2001 the share of suppliers to certify their quality systems to ISO 9000, for some automakers have reached 70%. Meanwhile, the expected result - increasing the quality of the products did not happen. In this connection, automakers, with the filing of AvtoVAZ, even created a new term - "paper quality", which characterizes the absence of real improvements in product quality in the presence of a certified ISO 9000 quality system.

Attempts of many companies, including the solution of quality problems through the creation of a system consistent with the requirements of international ISO standards and seeking to improve their competitiveness, is hampered by a number of serious obstacles. This also applies to foreign companies, but mostly for domestic ones.

First, the lack of traditions of strategic management leads to the fact that even senior level is not ready to plan the future, basing on the potential of the company and the forecasts for the environment. And therefore, a serious effort and investment needed for exploration and development of quality systems in companies is difficult to fund economically because they usually cannot provide short-term results, and focus on the more distant future properly not available yet.

Secondly, the lack of tradition of practical use of regular management typical for companies operating under market conditions, makes it necessary to accompany the formation of a modern quality system providing such management.

Third, the companies often have a so-called "triple-standard" - when plan in one way, write in another way, and make in the third way.

One of the most important features of the Russian industry is also an inherent ability not to engage in a lengthy analysis of problems and, moreover, do not always find their real causes. Everyone already have instructions, certificates for quality systems, and the fact that real improvements are not a lot and the quality of components is not improved as fast as required by the situation - it is possible for the tradition to try to "swing" it on numerous conferences and seminars. It remains an open question about speed of the application of new innovative approaches, many of which are familiar to domestic enterprises, but are rarely even used in the field of supply.

Russian automotive industry as a whole still retains its competitiveness, but only due to the price advantage and the relative poverty of the mass (not elite) of the consumer. However, these factors will always lose its importance for the reasons of growing price of the Russian

automotive materials and increasing economic prosperity and opportunities of the population in relation to economic growth, the accumulation of funds and the development of the credit system.

Today, however, the economic basis for changing the auto industry is not bad and it consists of the following:

The advantage of the tariffs for energy and raw materials

Reasonable wages

Resources to reduce losses and costs in the design, manufacturing, engineering, due to their archaic. They range from 30 to 80% of the cost, depending on the particular production.

Reducing production costs by applying the principles approaches and tools of "lean production", as well as improving the quality of the supply process (internal and external) can dramatically reduce the amount of input and operational control with the transition to self-control.

#### 4. Could You describe the process of ISO quality standards implementation in AEK ?

Konstantin: the company management decided to establish a quality system already in 2000. For its design, implementation and certification the quality department was set up, chaired by the Director of the enterprise. Methodological guidance on the development of QMS documentation, coordination of work on implementing it in production, testing the effectiveness of quality system, its further development and subsequent confirmation of compliance was assigned to the Deputy Director of Quality responsible for the quality system. A lot of work on staff training, unification of the officers and work instructions, training procedures were implemented, as well as a description of methods and technologies. The basic requirements were created upon the request of the Finnish side, and also methods and technologies of the company, taking into account the specific characteristics of production in Russia.

The reasons for the certification of production based on the requirements of ISO 9001:2000, ISO 14001: 1996 and ISO / TS 16949: 2002 based on the following points:

- Requirement of VOLVO
- Willingness to tighten requirements for the system as by the rest of buyers (Companies: SISU, Nordtrack, Timberjack, Nokia and others)
- Opportunity to supply new customers (Renault, Mack and others)
- Internal corporate requirement (PKC Group)
- The added benefits of a competitiveness
- Increase efficiency and profitability
- Reduce production costs
- Increase confidence in the company and its image

The course has been taken to ensure that quality control was not separated from the entire enterprise management system. Quality Department AEK was subordinated directly to the Director of the enterprise and the duties of the department of quality included staff training, development and management processes of the QMS, internal audits and audits of finished goods and the procedure for approval of production parts (PPAP).

All the activities of the enterprise were divided into seven major processes:

Management

Manufacturing (order / dispatch)

Logistics (storage of materials)

Maintenance

Quality (continuous improvement)

The development level of staff

Safety and welfare (H & S)

Relationships between them were defined, key goals and objectives were identified.

#### 5. How ISO certification audit was conducted?

Konstantin: The process certification audit in AEK took place in two stages. Both audits were conducted by an international company SGS. SGS is one of the five largest companies that conduct certification audits of SMU, and EMS. These five companies control about 90% of certification services in the world. An audit of ISO9001 and ISO14001 conducted two auditors, one from Finland, and the second one from Latvia. The audit was conducted for two days, at which have been tested key elements of quality system and environment. The audit made the verdict that the QMS and EMS in the company AEK comply with the standards and systems. AEK have been successfully certified, although the observations, but these were minor observations, some deficiencies in the system.

#### 6. Which deficiencies were found?

The greatest difficulties were associated with the personnel department, namely the preparation of plans for training and evaluating the effectiveness of the training. The situation was so critical that the company was forced to hire a new employee, which only dealt with education. There were, of course, plans for the training course, but they were developed in the production departments and they simply did not pass to the personnel development department. This was due both to an overload of work of the personnel department, and a misunderstanding of the head of the personnel department of the importance of the teaching staff.

After the successful certification according to ISO 9001 and ISO14001, AEK has been submitted for certification activities in accordance with industry standard ISO / TS 16949. The application was considered and accepted. An audit was conducted by specialists from Switzerland, because there were neither in Finland nor in Russia specialists responsible for the certification audit for ISO / TS in the SGS.

The audit was conducted during 5 days. The number of days was determined by the number of employees in the enterprise and the availability of other certificates, for example, with a certificate of ISO 9001 audit cycle reduced by 15%, i.e it's clear what value for the IATF and the world's leading automakers has certificate ISO 9001. Audit took place approximately in the same manner as the audit of ISO 9001 and ISO 14001, only with more emphasis on real work and performance, rather than the presence of beautiful prescribed procedures and documentation system for quality. That was its difference from its predecessor. Emphasis was placed on the validation of additional requirements of ISO / TS 16949 and support manuals: PPAP, FMEA, APQP, MSA, SPC, as well as the understanding and implementation by all employees of the enterprise requirements of ISO / TS 16949, from the General Director of the company and ending with the loaders.

That's what the auditor said at the end of the audit in his report: "The structure of the quality system meets the requirements of ISO / TU 16949, the above mentioned requirements of the customer, legal requirements and looks good and meets the requirements of the Organization. The system is still very young, but it is actively supported by the senior management and all employees are aware of the importance of quality, so QMS is actively developing. With regard to the process approach, there is much room for improvement. All comments were discussed and are mentioned in this report under "Opportunities for improvement," they should be discussed and corrective actions to take place before the next audit. The auditor appreciates the open and friendly atmosphere that accompanied the audit, access to required documentation and jobs, as well as team work and hospitality. "This means that the AEK has passed and this certification, and it is important to note that the AEK is the first of all the Group companies which has confirmed its compliance with the requirements of ISO / TS 16949. For instance, headquarter company in Finland was certified even later, which confirms the high trust from customers, the parent company as well as a highly organized work of the staff of the enterprise.

Naturally, the goal of any audit is to help the company in matters of continual improvement, and no any checking or auditor does not set a goal to fill up the enterprise, and opportunities for improvement are always there, even if the employees of the company do not see them, the auditor can assess everything and tell what could be improved so that a company may become more efficient and competitive, reduce potential risks, where they are. According to

the results, auditor made 11 opportunities for improvement (which is two times smaller, for example, than in similar enterprises in Estonia).

#### 7. Which methods were applied to improve the quality?

Konstantin: We were constantly implementing different methods. Brainstorming, Ishikawa diagram, FMEA, statistical methods are used as a tool for solving problems.

Analysis of failure mode and effects (FMEA) is used to analyze the major inconsistencies that can occur in production, their influence on the products, impacts, policy makers, who should be responsible for the quality of the process and the degree of importance.

In the context of planning the lifecycle of products another important method is used, the implementation of which require all customers from their suppliers. This is the procedure for approval of production parts or so-called PPAP process. Under the "part" here means any manufactured product which is delivered to customers. The purpose of PPAP procedure is to verify / ensure that the AEK understands customer requirements for design data and specifications applicable to the product.

We also implement the Plan Do Check Act method, which is a part of ISO standards systems.

#### 8. And which problems arised during implementation?

The main problem, besides the definition of the "process", is the fact that not all managers or process owners understand the importance of this cycle, it is very difficult sometimes to overcome the inertia of many executives, to bring to them the importance of the process approach and its impact on continuous improvement. This is the task of the chief of department of quality; bring up all the philosophy of total quality management.

The main problem of the successful use of these systems is the lack of necessary training of workers, and as a consequence is poor understanding of requirements and the need to implement them. The second difficulty is the complexity of the work on the development of these techniques. Indeed, to recognize and understand the requirements set out in these methods in one day, even for one month and then annually is difficult and almost impossible, especially if the company is large and consists of several units in each of which must fulfill these requirements.

Of course there were certain difficulties concerning ISO implementation. It happened due to following reasons: first, it was not simple to explain these ideas to the workers. Then, the wages were not high enough, as everywhere in Russia, and employees were simply not motivated for doing it.

## 9. How these problems were overcome?

We created an incentive system, where employees who produced more products without defects, were awarded with bonuses.

The main objective and purpose of the AEK is to convince and prove to the employees, particularly new ones, that quality does not appear during the testing, and the aim of testing is not to fix the defect. Many workers have often been asked why they should be responsible for quality, if, later products are checked by manufacturing controllers. But, first of all, supervisors do not check all the products, but only selectively, according to the categories of testing, and the second, controllers do not produce - their work and goals are somewhat different. Working staff at all levels should be encouraged to recognize the need and make suggestions about the publication of working methods, work instructions or other documentation. At the same time employees should be encouraged to express opinions and comments about the documentation may contain erroneous information, illogical, outdated methods of work with a view to adjusting such documents.

Different trainings were organized on the factory, for example, "Lean Production" training which proposes reducing production costs and at the same time increasing quality level. As a consequence, the Kamishibai T-cards project was implemented: boards with cards, on each cards there were mentioned main responsibilities of each production manager; when the working day was over, he had to check whether he has done everything turning over these cards. It was quite effective tool.

## 10. What would You like to say as a conclusion?

AEK was one of the first companies in Russia which has successfully passed the certification based on ISO / TS 16949 and should be proud of this, at least because despite the opinion of many foreign skeptics, in Russia it's possible to build a company which does not inferior to Western counterparts, it is possible to invest in the Russian economy, and not only to trade and export of natural resources. Of course, we cannot expect instant improvement of product quality after certification, it will be a long time, when we'll reach the absolute zero-defect production, but a huge step to improve the quality of both processes and products has been made. If three years ago, few people in the company had no idea about quality, quality system, customer requirements and responsibilities of the supplier, product liability, but now for each employee of the enterprise is a matter settled and clear. Now nobody can say that the head of the department of quality, or quality department, or supervisors are the only persons responsible for quality. All employees are aware of their responsibility for quality within the framework of the duties performed. This is a huge success across the enterprise, each individual employee. Of course, without the participation of Finnish partners it would have been much more difficult to achieve all of this, but this is a good example how to construct a cus-



tomer and supplier relationships, supplier and subcontractor. This is a good example of successful cooperation between Russian and foreign partners, and if all the automotive manufacturers will base their policy on the same principle, then they will achieve great strides in quality and become competitive not only due to low prices, but primarily due to high quality which is not an unattainable concept. Many foreign companies have already realized the benefits of working in Russia, where quality level is same, and sometimes even at higher capacity, but due to, first of all, cheap energy, and only then due to cheap labor it's possible to build businesses that are more competitive on world markets. For example, seeing the success of the AEK, in Kostomuksha other foreign enterprises began to emerge and, such as the Finnish firm "Ecowell", a major producer of electronic components, the Swedish firm "Swedwood", a division of the world's leading IKEA and many others. But no any foreign company would allow itself to risk its reputation for not being sure that the quality of its products produced in Russia or China would be worse than in Sweden or Germany. Customer does not evaluate reduction in prices due to low quality, but evaluates quality improvement and price reduction. Quality and quality systems aim to improve the quality and thus to make products more cheap due to efficient production.

Interview with Ksenia Schukina, the Quality Manager of AEK factory.

1. How do you deal with documentation related to quality management?

All QMS of AEK is reflected and documented in the Quality Manual and supporting procedures and instructions. The quality manual describes the operating principles in the AEK, based on the standards of ISO9001, ISO/TS16949 and the customer's requirements with respect to the applicable operational procedures and defines the processes necessary for the functioning of the quality system in conjunction with important aspects of the work and working procedures. Description of these processes determines the aspects of Quality Management System, their order and their joint interaction. The system shows how these processes are introduced in practice and how they are used in the enterprise. Quality management system documentation also defines the requirements and procedures necessary to assess the functionality and efficiency following Quality Systems and related processes.

Head of Quality Department in Finland are responsible for shared resources and information that covers the entire PKC Group and are responsible for a single process. Head of Quality Department in Kostomuksha is responsible for internal resources and information that supports the quality management system processes in OOO AEK and their control. Head of Quality Department in Kostomuksha brings to the management of an enterprise quality management system requirements and is responsible for the availability of resources and information across the enterprise.

All documentation related to the quality is stored according to a separate procedure. One of the ISO 9001 and ISO / TS requirements is that the process of records management in the enterprise should be documented and maintained. At AEK, management procedures concerning documentation are developed of course, documented and maintained in working condition. The purpose of this procedure is to establish a rigorous procedure for compiling the documentation, its validation, approval, distribution and modification follow. The established order of work applies to all quality system documents, including policies on quality, quality manual, procedures, instructions and other supporting documents. Documentation is identified by name, document number, release date, version and name of the originator and approver. All of this is necessary in order to avoid the use of outdated documentation activities.

## 2. How do you communicate the importance of quality management to employees?

Working staff at all levels should be encouraged to recognize the need and make suggestions about the publication of working methods, work instructions or other documentation. At the same time employees should be encouraged to express opinions and comments about the documentation may contain erroneous information, illogical, outdated methods of work with a view to adjusting such documents.

Each employee contributes to the quality of their work and each is responsible for the quality of their work and adjusts the gaps for the implementation of customer requirements, performance standards and ISO/TU16949 ISO9001: 2002, by following the operating instructions, procedures and guidelines for quality.

Importance and value of quality management brought to the employees during the training of new employees and in the process of training on quality.

## 3. How do you analyze the efficiency of QMS at the factory?

The management of AEK is analyzing the Quality Management System at least 4 times a year, approximately every three months. Analysis is conducted by the management of AEK. The quality objectives, policy on quality, and their implementation are monitored and evaluated in the analysis by management.

Availability and efficiency of quality management system is evaluated by comparing the quality goals and the achieved results and the results of internal and external audits. The suitability of the Quality Management System and the availability of necessary resources are estimated by all the inconsistencies and comments to them. Based on the existing discrepancies the necessary measures are taken to promote and improve the situation.

Conducting the analysis by management is the responsibility of the general director; a summary is introduced by the head of the quality department. A copy of

the report analysis, translated into English, sent to the head of the department of quality in Finland.

4. How the analysis of QMS is conducted by management of the enterprise? Which issues are taken into consideration?

A management review includes monitoring of key objectives, indicators of quality and cost of poor quality. Direction of quality development is included in the analysis by management.

Management review is carefully studying the audits, discrepancies discovered during these audits and the effectiveness of corrective actions. All decisions to conduct remedial actions related to improvement and development are based on this information. Internal audits cover all elements of the Guidelines for quality and environmental protection. Management review also touches on the changes in a production environment, which may cause changes in quality management systems.

The result of the management review are established events, which aim is to develop and improve Quality Management System, developing and improving the processes of this system, considering the customer requirements for quality products and processes across the enterprise. They are recorded in the minutes of meetings of the management. In addition, new targets can be set and needs for additional resources identified.

5. Are there other indicators to monitor the quality?

Process monitoring is also done with the help of key indicators that are suitable for this process. These key indicators of the system include PPM (the number of errors per million of output) of the customer, internal PPM, accuracy and delivery performance. Key indicators are constantly measured and analyzed at the meetings of the management. If there is a need a corrective actions are carried out, based on relevant data.

6. What kinds of audits are conducted on the enterprise?

An audit of the production is a continuous work, responsibility for which rests on the Quality department. The purpose of the product audit is to measure the effectiveness of the entire manufacturing process starting with the input control and ending with packaging products, in which it is delivered to the customer. The occurrence of the audit process of production is described in the procedure "Audit of the quality of the finished product" and audit schemes.

In addition to auditing the quality management system there are also audits of the production process conducted to monitor its effectiveness and efficiency. These audits are based on descriptions of processes. Audits of manufacturing processes are an additional requirement of ISO TS 16949. It differs from the internal audit of quality management system in the focus on proper procedure for organizing processes in manufacturing. For example, the chosen manufacturing process - "assembly" and the auditors are coming for any assembly table and check the availability of work instructions, drawings and specifications that they were the last production version, their availability, check sheets of material, the need for a working tool, etc. According to the discovery of inconsistencies the plan of corrective actions is done.

The third type of internal audit is an audit of finished products. Before the products are packed in a designated customer packaging, a green label / card "OK" is placed, which ensures that products meet specifications and have passed all steps of the manufacturing process. Only the packaging which is labeled in such a way can be delivered to the place of shipment or storage.

Product audit of is applied for the finished and packaged products. Product, which undergoes complete control, is taken out of the box ready for shipment. Red and yellow cap is placed into the package or container from which product has been taken, to prevent the sending of an incomplete party. The product which is subjected to an audit is checked on the accuracy of compounds and compliance with all statutory requirements.